

## **REMARKS**

### **Request for an Examiner's Interview**

The Applicants' Attorney hereby requests an interview with the Examiner in order to expedite the prosecution of this case.

### **Pending Claims**

Claims 1-44 are pending in the present application. Claims 1, 20, 28, and 44 have been amended. The Applicant respectfully requests reconsideration of the pending claims in light of the amendments and arguments presented in this Amendment and Response for RCE.

### **Allowable Subject Matter**

The Applicants acknowledge with appreciation the statements on Page 14 of the Office Action dated August 10, 2005 that claims 13-16, 22-24, 26-27, 32, 36-38 and 40-43 are allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### **Rejection Under 35 U.S.C. §112**

The Applicants acknowledge with appreciation the statements on Page 2 of the Office Action dated March 1, 2006 that the rejection to claim 12 has been withdrawn and it now allowable over the prior art of record.

### **Rejections under 35 U.S.C. §102(b) As Being Anticipated by Shoval**

Claims 1, 10, 11, 17-18, 28-29, 39 are rejected under 35 U.S.C. §102(b) as being

anticipated by Shoval. The Office Action dated March 1, 2006 states in page 2 that the arguments filed in the Amendment and Response dated December 9, 2005 and the Supplemental Amendment and Response filed January 30, 2006 with respect to these claims are not persuasive.

The Office Action further states that the rejection under 35 U.S.C. §102(b) is maintained because the existence of multiple modes is expressly taught by Shoval. The Office Action describes the operation of the mode converter shown in Shoval FIG. 13 by stating that the single mode optical signal sent by the single mode fiber (104) is converted to a plurality of modes. The Office Action refers to Shoval column 9, line 20 to column 10, line 4 to support the statement that single mode optical signal sent by the single mode fiber (104) is converted to a plurality of modes. The Office Action then concludes that Shoval explicitly teaches multiple individual modes.

To anticipate a claim under 35 U.S.C. §102, a single reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught by the reference must be inherently present in the reference. Thus, a claim is anticipated by a reference only if each and every element of the claim is described, either expressly or inherently, in a single prior art reference.

#### Independent Claim 1 and Dependent Claims 2-19

The Applicants have amended independent claim 1 to further distinguish Shoval. Specifically, independent claim 1 was amended to recite that the first spatial mode converter converts the optical signal to a plurality of modes including a fundamental mode with information content. The Applicants respectfully disagree with the Examiner's description of Shoval. The Applicants believe that the mode transformer 126 is designed to convert all of the

light to a single higher order spatial mode, such as the LP02 mode, and is designed not to pass a fundamental mode with information content.

In particular, the Applicant believes that LP01 noise shown in Shoval FIG. 13 is not passed by the mode transformer 126. Instead, the Applicants believe that the LP01 noise is either generated in the spatial mode transformer 126 itself or is generated in the transmission higher order mode optical fiber. See, for example, Shoval column 9, lines 42-45, which states that “[t]he fiber is optimized to support the LP02 spatial mode, and during transmission noise is generated, some of which is generated in the LP01 spatial mode” (emphasis added).

Furthermore, the Applicants want to emphasize that Shoval refers to the fundamental signal components propagating after the spatial mode transformer 126 as “noise”. Noise in a communications system is defined as an undesirable signal that obscures or reduces the clarity of the desired signal that carries the information content. The applicants have amended independent claim 1 to specifically recite that the fundamental component includes information content to further distinguish Shoval.

Therefore, the Applicants submit that independent claim 1 is allowable over Shoval because Shoval does not teach the invention recited in claim 1 with a spatial mode converter that converts the optical signal to a plurality of modes including a fundamental mode with information content. In addition, the Applicants submit that dependent claims 2-19 are allowable as depending from an allowable base claim.

Independent Claim 28 and Dependent Claims 29-43

Similarly, independent claim 28 has been amended to recite that the first spatial mode converter converts the optical signal to a plurality of modes including a fundamental mode with information content. As stated in connection with the rejection of claim 1, Shoval does not teach a spatial mode converter that converts the optical signal to a plurality of modes including a fundamental mode with information content. Therefore, the Applicants submit that independent claim 28 is allowable over Shoval. In addition, the Applicants submit that dependent claims 29-43 are allowable as depending from an allowable base claim.

#### Independent Claim 44

Similarly, independent claim 44 has been amended to recite a means for spatial mode converting an optical signal to a plurality of modes including a fundamental mode with information content. As stated in connection with the rejection of claim 1, Shoval does not teach a spatial mode converter or other means that converts the optical signal to a plurality of modes including a fundamental mode with information content. Therefore, the Applicants submit that independent claim 44 is allowable over Shoval.

#### **Rejections under 35 U.S.C. §103(a)**

Independent claim 20 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Shoval in view of U.S. Patent Number 6,609,834 to Cunningham. To be unpatentable under 35 U.S.C. §103(a), the differences between the subject matter sought to be patented and the prior art must be such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the

reference teachings. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.

Independent claim 20 has been amended to recite the step of spatial mode converting an optical signal to a plurality of modes including a fundamental mode with information content. Shoval and Cunningham do not teach or suggest alone or in combination the method claimed in independent claim 20 including spatial mode converting an optical signal to a plurality of modes including a fundamental mode with information content. Thus, a *prima facie* case for obviousness has not been established.

Therefore, the Applicants submit that independent claim 20 is allowable over Shoval in view of Cunningham. In addition, the Applicants submit that dependent claims 21-27 are allowable as depending from an allowable base claim.

## **CONCLUSION**

Claims 1-44 are pending in the present application. Claims 1, 20, 28, and 44 have been amended. The Applicant respectfully requests reconsideration of the pending claims in light of the amendments and arguments presented in this Amendment and Response.

If, in the Examiner's opinion, a telephonic interview would expedite prosecution of the present application, the undersigned attorney would welcome the opportunity to discuss any outstanding issues, and to work with the Examiner toward placing the application in condition for allowance.

Respectfully submitted,

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Reg. No. 40,137

Tel. No.: (781) 271-1503  
Fax No.: (781) 271-1527

/Kurt Rauschenbach/  
Kurt Rauschenbach, Ph.D.  
Attorney for Applicant  
Rauschenbach Patent Law Group, LLC  
Post Office Box 387  
Bedford, MA 01730